Achieving Army-Marine Corps Logistic Interoperability

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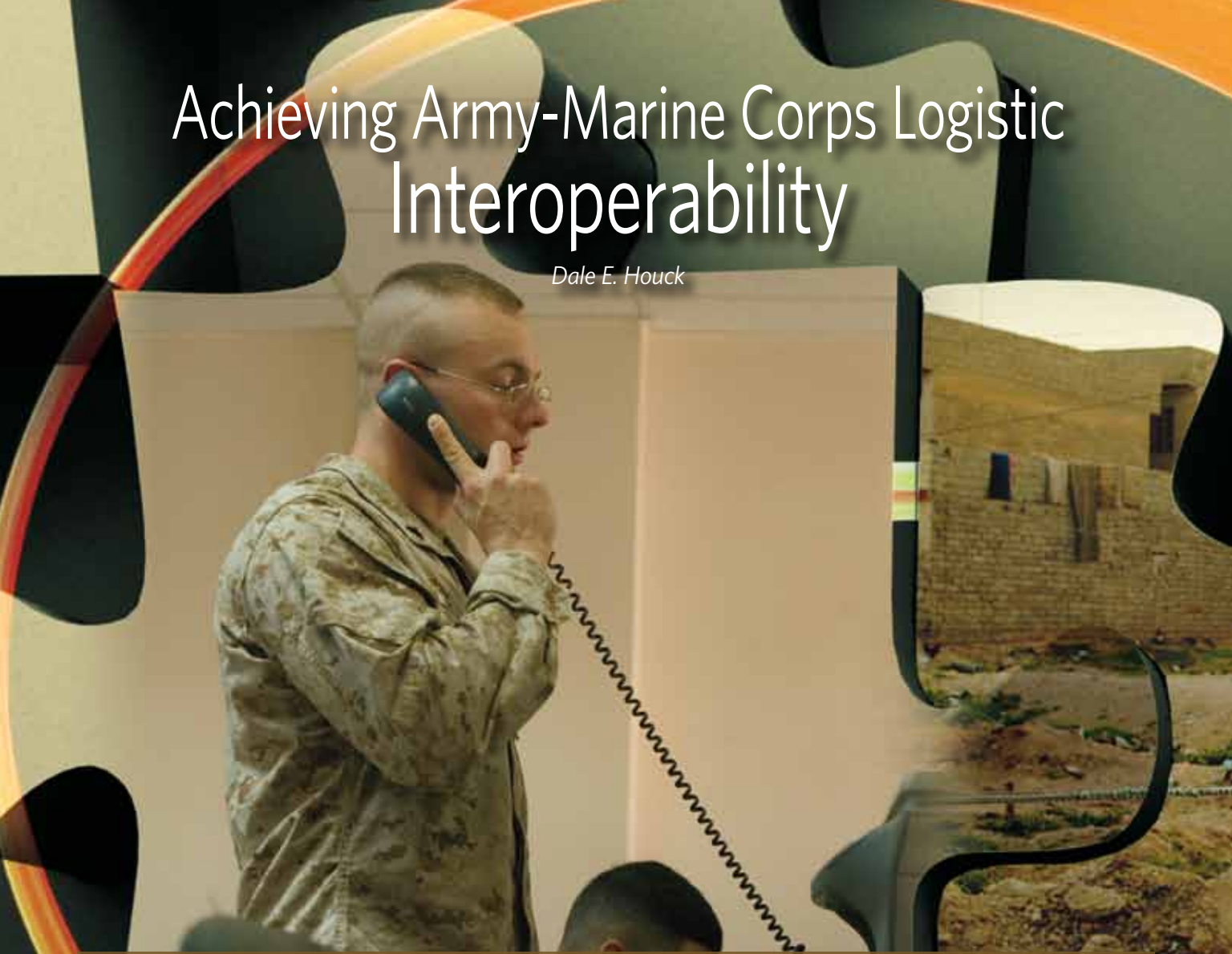

An Army Stryker battalion is attached to a Marine expeditionary brigade's regimental combat team, which is being supported by the brigade's logistics forces ashore and at sea. On the fifth day of operations ashore, a Stryker health management system identifies a maintenance problem and automatically initiates a call-for-support message. The Stryker crew uses the platform's embedded interactive electronic technical manual to verify the turbocharger has failed and must be replaced. The platform commander submits the call-for-support message for maintenance, providing necessary information to the Stryker battalion supply and logistics officer by means of Force XXI Battle Command, Brigade-and-Below/Joint Capabilities Release (FBCB2/JCR), an automated information system that facilitates enhanced tactical command and control (C2) and situational awareness through the incorporation of interoperable data standards and messaging methods. The supply and logistics officer analyzes the situation and determines he has neither the parts (meaning the turbocharger) nor qualified maintenance

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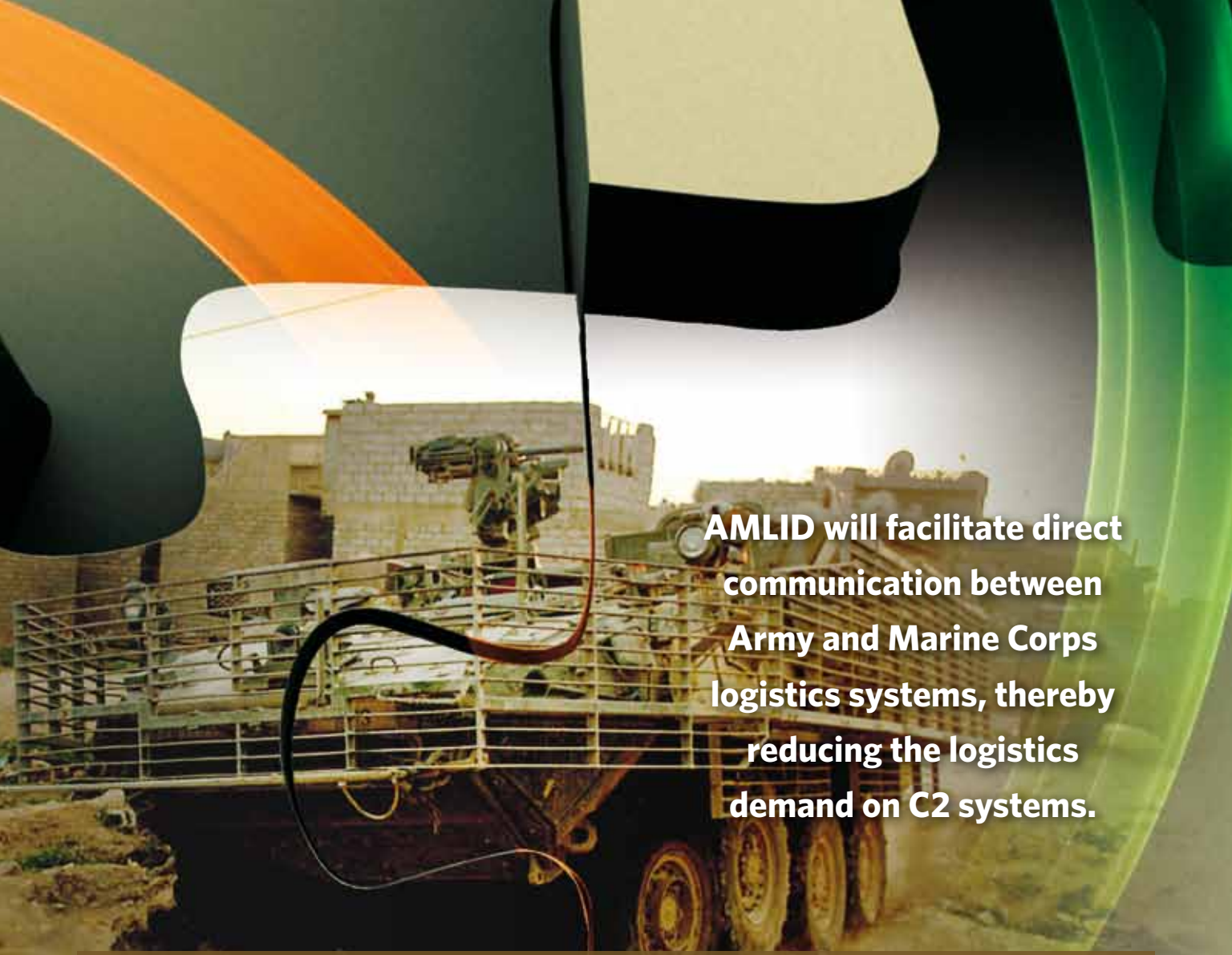

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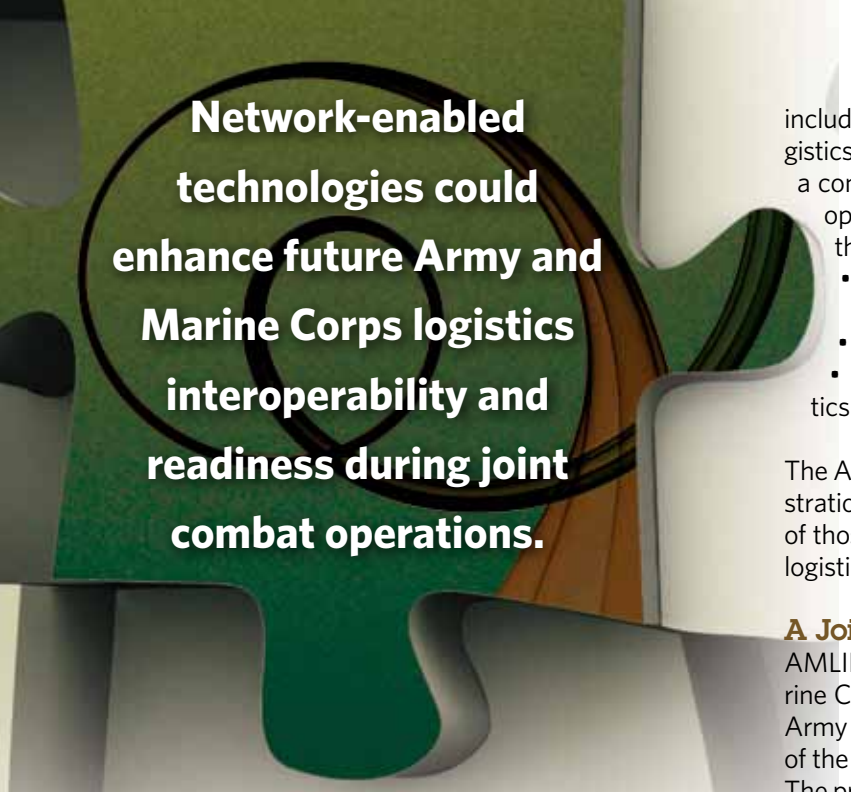
personnel (meaning limited forward maintenance team support attached to the Stryker battalion) to support this problem. He forwards the call-for-support message to the Marine Corps' direct support combat logistics battalion operations officer. At the same time, information is extracted from the variable-message-format call-for-support message to automatically open a service request for maintenance in the Marine Corps' logistics business system, the Global Combat Support System-Marine Corps. The direct support combat logistics battalion operations officer uses GCSS-MC to determine that qualified maintenance personnel are available, but the required part is not. The direct support combat logistics battalion operations officer (located ashore) initiates a requisition for the turbocharger in GCSS-MC and forwards it to the general support combat logistics battalion operations officer (located at sea). The general support operations officer cannot satisfy the requirement and forwards the requisition via GCSS-MC to the sea-base, where the turbocharger is sourced. The reinforced combat logistics regiment manages the distribution of the turbocharger to the direct support combat logistics battalion operations officer, who then ensures the turbocharger and a maintenance contact team are sent to fix the Stryker.

While that scenario is hypothetical, it is typical of the circumstances faced by soldiers and Marines in joint operations. In the scenario, the request for support, initiated as an FBCB2/JCR variable-message-format message, is automatically and seamlessly integrated into the business processes and systems of the supporting service without requiring either service to change its unique processes or systems, demonstrating true joint logistics interoperability. The scenario illustrates how network-enabled technologies could enhance future Army and Marine Corps logistics interoperability and readiness during joint combat



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operations. Inter-Service obstacles to seamless communications are overcome, and common logistics support is delivered to the operational commander on the battlefield.

Operations Desert Storm, Iraqi Freedom, and Enduring Freedom revealed that joint and Service logistics systems that could not communicate with each other resulted in order-fulfillment lag times, redundant ordering, choked supply pipelines, and uncertainty for the warfighter. It was readily apparent that deployable, integrated technology was necessary to provide responsive, agile, and flexible logistics support to the warfighter. As a result, the Army and Marine Corps have been collaborating to leverage and integrate their logistics capabilities to accomplish missions at the tactical level.

Future Imperatives

Two imperatives needed to ensure operational logistics adaptability are reduced logistics demand and intelligent supply chains, with both enabled by data fusion and science and technology. Operational logistics adaptability translates to decision making in the face of complexity and the ability to share information across the joint force unhindered by distance, terrain, weather, or hostile activity; and intelligent supply chains of the future will require radically advanced data collection, transmission, analysis, and discovery of relationships normally hidden in vast quantities of data scattered throughout multiple global data bases. Reduced logistics demand and intelligent supply chains will require integrated and interoperable logistics systems and processes, providing a near-real-time logistics common operating picture and adhering to common net-centric standards and protocols—necessary for success within a common logistics operating environment.

The future land component will be, by necessity, net-centric and interoperable within the full range of military operations, including interagency and coalition partners. The Joint Logistics White Paper (draft version 0.6, June 2009) describes a concept for providing logistics support to a future joint operating force in the 2016-2028 timeframe. It describes three well-documented issues that must be overcome:

- Insufficiently integrated logistics organizations and processes
- Execution issues
- Insufficiently interoperable/integrated C2, logistics management, and financial systems.

The Army-Marine Corps Logistics Interoperability Demonstration (AMLID) is a significant step in addressing several of those issues as it works toward improved Army-Marine logistics capabilities.

A Joint Effort for Interoperability

AMLID project is a joint effort between the Army and Marine Corps, with project management provided by the U.S. Army Logistics Innovation Agency, a field operating agency of the Office of the Deputy Chief of Staff of the Army, G-4. The project's goal is to enable Army-Marine Corps logistics interoperability and joint interdependence by creating the capability to exchange actionable information across Service boundaries needed for joint task force employment. Interoperability—the basic tenet of AMLID—provides a compelling case for obtaining required support for a tactical unit from an attached sister Service, as far forward as possible, to eliminate the requirement to conduct reachback logistics support via stovepiped Service systems.

AMLID will perform information exchanges of platform-generated data between logistics and C2 systems. That will result in a cross-Service fulfillment of a logistics support request; and the sharing of common situational awareness across the joint logistics operating environment, building on both Services' logistics operational architectures. AMLID will provide a useful, near-term practical application of logistics C2 convergence through advanced technology insertion. It will allow Services to operate using their business systems and practices, but still operate jointly. AMLID seeks to provide rapid inter-Service fulfillment of a common sustainment requirement in time-sensitive situations (i.e., when it is more efficient or effective as a result of one or more factors related to mission, enemy, terrain and weather, troops and support available, or time available). While AMLID will demonstrate information exchanges from the platform level via FBCB2/JCR to another Service's logistics system, its metadata dictionary and data translation standards, defined during development of the initial system interfaces, could support further development of a broader spectrum of system interface software and more extensive net-centric logistics capabilities.

Creating Logistics Synergy

AMLID, a four-phased project, will facilitate direct communication between Army and Marine Corps logistics sys-

tems, thereby reducing the logistics demand on C2 systems. The AMLID team will develop the seamless integration of variable-message-format data between tactical C2 and logistics systems from each Service as well as the automated extraction of variable-message-format data from the tactical C2 systems and insertion directly into each Service's logistics systems to automatically open service requests, work orders, and supply requisitions. The team has developed a software interface tool known as the Marine-Army Joint Interoperability Component using a service-oriented architecture approach to bridge the gap between systems and networks. A service-oriented architecture approach provides a framework for organizing and orchestrating application functions/services across system boundaries. Within this framework, MAJIC acts as the translator to enable FBCB2/JCR variable-message-format combat service support messages to be exchanged and accurately interpreted among supporting and supported units.

The AMLID use-case scenarios address likely threat scenarios. The use-case technique is used to capture a system's behavioral requirements generated from requests that are based on scenario-driven threads. Completed in March 2009, AMLID Phase I was a laboratory-based demonstration of interoperable network architecture that tested prototype system interfaces and information exchanges. Scenarios were focused at the tactical echelon and included mission threads for resupply of petroleum, oil, and lubricants; ammunition; logistics situational awareness; and maintenance support. The intent was to simulate logistics calls for support by passing Joint Capabilities Release-initiated information to GCSS-MC through an enterprise service bus and to a standard Army management information system (STAMIS). FBCB2/JCR version 1.0 was used to send variable-message-format logistics messages from the Marine Corps to the Army and included situation reports, logistics status reports, and call-for-support messages.

Phase I

The Phase I demonstration, conducted at the Marine Corps GCSS-MC System Integration Lab at Pennsylvania State University's Applied Research Laboratory, successfully demonstrated interoperability between Army and Marine Corps information transmissions via FBCB2/JCR, each Service's logistics systems, and MAJIC. Four different use-cases were evaluated, resulting in a 97-percent success rate for the message transfer/translation process. Phase I—and MAJIC in particular—demonstrated that Army and Marine Corps tactical units can transmit requests for emergency logistics requirements between logistics systems using interpretive software (middleware) to translate the raw data inherent in the variable-message-format requests between the Services.

Phase II

AMLID Phase II is currently under way. It includes a senior leadership live platform demonstration that showcases a network architecture expanded to include C2 and logistics systems and processes up to and including the operational echelon. The demonstration consists of two scenarios—forced-entry operations and decisive land operations—with each scenario incorporating situational awareness threads integrated with related C2 monitoring systems. The forced entry operations scenario will include a use-case and thread for petroleum, oil, and lubricants; ammunition; distribution; and logistics situational awareness, while the decisive land operations scenario will focus on repair parts, maintenance, distribution, and logistics situational awareness. The ability to seamlessly communicate requests for service, feedback, and status information between GCSS-MC and the Army STAMIS/GCSS-Army system is a primary objective. A successful demonstration will provide a valuable assessment on the potential to eventually extend the same capability to Global Combat Support System-Joint.

Phase II—which is designed to successfully pass logistics information between Service logistics systems—will significantly advance the utility of interoperability, resulting in platform-level data aggregated in C2 systems and joint logistics situational awareness. Information will flow between operating combat platforms, a Marine Corps light armored vehicle, and an Army Stryker using FBCB2/JCR—through MAJIC—allowing information to go from one Service to another. Upon completion, AMLID will have developed consolidated mission threads for petroleum, oil, and lubricants; ammunition; and repair parts; as well as distribution in-transit visibility and logistics situational awareness. DoD's Battle Command Sustainment and Support System will be integrated into the overall network architecture in order to manage logistics situational awareness through the various logistics supporting establishments to the theater sustainment command and Joint Task Force component commander.

Successful completion of Phase II will serve as a foundation for prospective follow-on Phases III and IV. AMLID team stakeholders envision Phase III to be the development of a fielding plan for the logistics interoperability functionality that was developed, blueprinted, and demonstrated during Phases I and II. The project would culminate in Phase IV, providing for the advanced integration of AMLID technology into other closely related logistics modernization programs, such as the Marine Corps' Autonomic Logistics effort and the Army's Conditions-Based Maintenance Plus project. While not yet officially sanctioned by Service proponents, those follow-on efforts could potentially support the objectives of the Services' combat service support and sustainment missions and the visions outlined in their higher-level logistics architectures.

Logistics Architectures

AMLID is a major initiative of the Army's Common Logistics Operating Environment Program and is aligned with objectives of the Marine Corps' Logistics Modernization program and Joint Forces Command's Joint Interoperability and Data

Dissemination Strategy. The Common Logistics Operating Environment is the Army's capstone initiative to synchronize diverse logistics modernization efforts into a cohesive, net-centric logistics domain. The effort integrates data across the full spectrum of logistics and includes equipment platforms, logistics information systems (including GCSS-Army), and C2 systems—all functioning within a common architectural framework described in detail by the Army's Training and Doctrine Command-validated Army Integrated Logistics Architecture. That architecture spans from the tactical through strategic echelons; supports a joint, integrated environment; and assists the Army logistics community in achieving integration and interoperability in the logistics domain.

The Marines' Logistics Modernization Program will produce a more effective and efficient logistics chain management process, with modernized, integrated, and streamlined supply, maintenance, and distribution processes that conform to the Marine Corps' Logistics Operational Architecture. The architecture supports the implementation of enterprise-wide processes for logistics and will be supported by a thoroughly modernized enterprise resource planning system, GCSS-MC.

Both the Army and the Marine Corps architectures provide the framework to clearly define logistics processes and to implement net-centric warfare principles in the logistics domain. Additionally, they provide the foundation to move beyond the unsynchronized use of a handful of common C2 systems and help realize a unity of effort within the logistics joint capability area.

Architecturally, AMLID supports both the Army's and the Marine Corps' logistics architectures and seeks to provide a flexible support construct that integrates various logistics systems across Service boundaries. It is accelerating the technology maturation process for logistics automation in a joint operational environment. The Phase II demonstration will provide an early opportunity to perform focused testing on the latest version of GCSS-MC's Release 1.1 software and evaluate its prospective future interoperability with the Army's STAMIS. Ultimately, DoD Architecture Framework products developed for AMLID will be fed back to the Marine Corps' Logistics Operational Architecture and the Army Integrated Logistics Architecture to assist in the further development of common data standards and associated architectures that will facilitate logistics net-centricity and fully integrated Army and Marine Corps operations.

A Significant Step

The Army and Marine Corps continue to reduce gaps in logistics interoperability related to organizational and system interface differences and non-standard architecture. AMLID identifies gaps in process or system interoperability where additional work may be necessary in order to support the development of a composite architecture (the Marine Corps' Logistics Operational Architecture and the Army Integrated Logistics Architecture) necessary for joint interoperability. AMLID's service-oriented architecture allows different applications to exchange data, and tools such as MAJIC will make it possible to securely exchange information between Service enterprise resource planning systems and legacy systems.

AMLID does not purport to be a final solution in resolving interoperability issues between the Army and Marine Corps or other DoD services and supporting government agencies; however, it is the focused application of technology solutions to improve the efficiency of Army-Marine Corps operations as part of a joint force. AMLID is a significant step in achieving:

- More effective and efficient joint logistics
- The coordinated use, synchronization, and sharing of two or more military departments' logistic resources to support the joint force
- A foundation for future programs, such as GCSS-Joint.

As AMLID evolves to support remaining classes of supply, it will integrate disparate Service information systems and data to provide enhanced visibility of resources and requirements; and it will provide Army brigade combat teams and Marine Corps regimental combat team commanders, and ultimately all of DoD, an effective means to achieve mission objectives.

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